

EXHIBIT 25



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
GUSTAVO MATA ET AL.

Serial No.: 10/135,145

Filed: 4/30/2002

For: AGENT REACTIVE SCHEDULING IN
AN AUTOMATED MANUFACTURING
ENVIRONMENT

Group Art Unit: 2125

Examiner: JAYPRAKASH N. GANDHI

Atty. Dkt. No.: 2000.079600/JAP

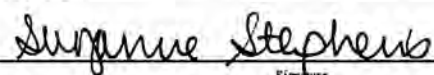
CUSTOMER NO. 23720

APPEAL BRIEF

MAILSTOP APPEAL BRIEF-Patents

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8	
DATE OF DEPOSIT:	November 22, 2004
I hereby certify that this paper or fee is being deposited with the United States Postal Service with sufficient postage as "FIRST CLASS MAIL" addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.	
 Signature	

On September 14, 2004, Appellants filed a Notice of Appeal in response to a Paper No. 13 dated June 15, 2004, issued in connection with the above-identified application, which was received and stamped by the USPTO Mailroom on June 18, 2004. In support of their appeal, Appellants hereby submit an original and two copies of this Appeal Brief to the Board of Patent Appeals and Interferences in response to the Paper No. 13 dated June 15, 2004 ("Paper No. 13"). The fee for filing this Appeal Brief is \$340, and is authorized to be charged to Advanced Micro Devices, Inc. Deposit Account No. 01-0365/TT4739.

Also, a request for a one month extension of time to respond is included herewith. Enclosed is a check in the amount of \$110 in payment for the extension. This one month extension will bring the due date to December 14, 2004. If the check is inadvertently omitted, or should any additional fees under 37 C.F.R. §§ 1.16 to 1.21 be required for any reason relating to

the enclosed material, or should an overpayment be included herein, the Director is authorized to deduct or credit said fees from or to Williams, Morgan & Amerson, P.C. Deposit Account No. 50-0786/2000.079600/JAP.

I. REAL PARTY IN INTEREST

Advanced Micro Devices, Inc., the assignee hereof, is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences of which Applicant, Applicant's legal representative, or the Assignee is aware that will directly affect or be directly affected by or have a bearing on the decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 1-53 are pending in the case, each having been originally filed. The "final" Office Action ("Paper No. 13") rejected each of claims 1-53 as anticipated under 35 U.S.C. § 102 (b) by U.S. Letters Patent 5,369,570 ("Parad"). Applicants traverse each of the rejections, and appeals each of them herein.

IV. STATUS OF AMENDMENTS

There were no amendments submitted after the "final" Office Action.

V. SUMMARY OF THE INVENTION

The invention, in its various aspects and embodiments, is a method and apparatus for scheduling in an automated manufacturing environment. One such automated manufacturing environment is the embodiment of **FIG. 1**, reproduced below. The illustrated portion of the process flow 100 includes two stations 105, each station 105 including a computing device 110 communicating with a process tool 115. The stations 105 communicate with one another over communications links 120. In the illustrated embodiment, the computing devices 110 and the communications links 120 comprise a portion of a larger computing system, *e.g.*, a network 125. The process tools 115 in **FIG. 1** are processing lots 130 of wafers 135 that will eventually become integrated circuit devices.

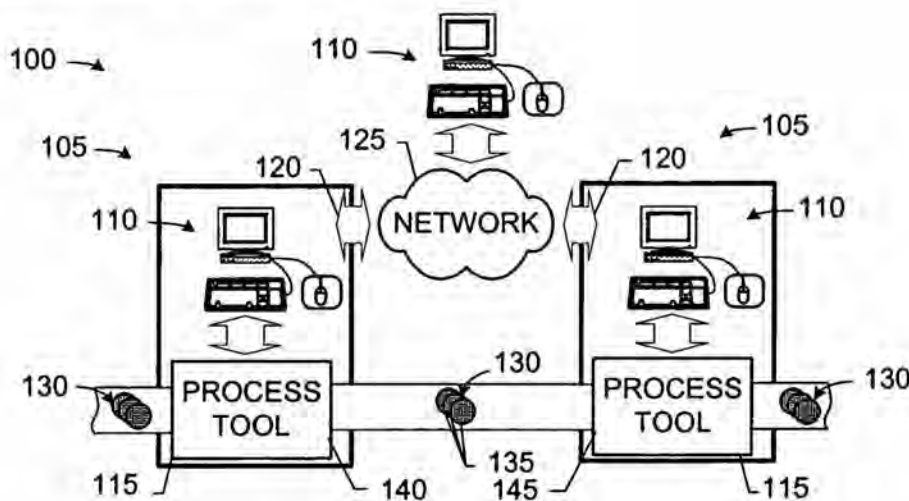


FIG. 1

Each computing device 110 includes, in the illustrated embodiment, a software agent 265, shown in **FIG. 2**, residing in the storage 210, also shown in **FIG. 2**. Note that the software agents 265 may reside in the process flow 100 in places other than the computing devices 110. The software agents 265 each represent some “manufacturing domain entity,” *e.g.*, a lot 130, a process tool 115, a resource, a PM, or a Qual. The software agents 265, collectively, are

responsible for efficiently scheduling and controlling the lots 130 of wafers 135 through the fabrication process.

In one particular embodiment, a method in accordance with the present invention detects an occurrence of a predetermined event in a process flow, *e.g.*, the process flow 100 in **FIG. 1**. More particularly, the software agents 265 react to different events that occur within the process flow 100. These events are identified beforehand, *i.e.*, are “predetermined,” so that appropriate activities in reaction to those events can be defined. The appropriate actions will depend on a number of factors including not only the type of manufacturing domain entity involved, but also the type of event that is involved. The predetermined events are categorized, in the illustrated embodiment, as one of three types: appointment state change, a factory state change, or an alarm event. The reactive scheduling performed upon the occurrence of any particular event will depend on the nature of the event and, to some degree, upon the particular implementation.

Next, the method notifies a software scheduling agent, *e.g.*, a scheduling agent 265 in **FIG. 2**, of the occurrence. Note that this implies a knowledge that such events are occurring within the process flow 100. To this end, in the illustrated embodiment, the software agents 265 respond to additional software components, not shown, known as “publishers” (or, “notifiers”) and “subscribers.” Agents create listeners which subscribe to one or more notifiers. Notifiers “publish” events to their subscribing listeners when changes occur within the factory. Listeners, in turn, call their subscribing software agent 265. Through a network of these types of publishers and subscribers, the scheduling agents 265 can be kept apprised of events occurring in the process flow 100.

The method then reactively schedules an action from the software scheduling agent, *e.g.*, the software scheduling agent 265, responsive to the detection of the predetermined event.

Typically, in the illustrated embodiment, reactive scheduling by the software agents 265 effects changes to appointments that were, in the first instance, proactively scheduled. However, this is not necessary to the practice of the invention. For instance, in one particular embodiment, the software agents 265 schedule activities in reaction to a machine failure which causes the machine to stop processing and requires a period of downtime in order to repair the machine. There usually would not be any proactively scheduled appointment for such an event since a machine failure usually cannot be predicted in advance.

Alternative embodiments include a computing system programmed to perform this method, *see* **FIG. 2**, and a computer-readable program storage medium, *e.g.*, the optical disk 230 or floppy electromagnetic disk 235 in **FIG. 2**, encoded with instructions to implement this method. In still another embodiment, the invention includes automated manufacturing environment, *see* **FIG. 1**, comprising a process flow and a computing system. The computing system further includes a plurality of software scheduling agents residing thereon, the software scheduling agents being capable of reactively scheduling appointments for activities in the process flow responsive to a plurality of predetermined events.

VI. ISSUE ON APPEAL

Whether claims 1-53 are anticipated under 35 U.S.C. § 102 (b) by U.S. Letters Patent 5,369,570 ("Parad").

VII. GROUPING OF THE CLAIMS

The claims rise and fall together.

VIII. ARGUMENT

Paper No. 13 rejected claims 1-53 as anticipated under 35 U.S.C. § 102 (b) by U.S. Letters Patent 5,369,570 ("Parad"). An anticipating reference, by definition, must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. M.P.E.P. § 2131; *In re Bond*, 15 U.S.P.Q.2d (BNA) 1566, 1567 (Fed. Cir. 1990). Applicants respectfully submit that Parad fails to meet this strict standard and that the rejections fail procedurally.

A. PARAD FAILS TO DISCLOSE ALL THE CLAIM LIMITATIONS

Each of the independent claims 1, 12, 19, 26, 33 and 44 recites a "software scheduling agent." Paper No. 13 concedes that Parad fails to expressly disclose a software scheduling agent, but alleges that such is an "inherent property of Parad [*sic*] invention." Inherency in anticipation requires that the asserted proposition *necessarily* flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d (BNA) 1461, 1463-1464 (Pat. & Tm. Off. Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987).

To inherently anticipate, it is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirk v. Kemmer*, 40 U.S.P.Q. (BNA) 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d (BNA) 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; *see also Skinner*, at 1789. "Inherency... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Skinner*, at 1789.

The existence of a “software scheduling agent” does not necessarily flow from Parad’s disclosure, and thus is not inherently disclosed therein. Parad expressly states at col. 7, lines 53-54 that “[t]he present invention may be implemented in any combination of software, firmware, or hardware....” Thus, even if the Office can identify some functionality, or collection of functionalities, corresponding to that of Applicants’ claimed “software scheduling agent,” such functionality need not necessarily be implemented in software in Parad. Parad’s own disclosure establishes that such functionality could be implemented in, for example, hardware, as opposed to software.

Consequently, it does not necessarily flow that such functionality would be implemented in a “software scheduling agent”, and Parad fails to inherently teach such a limitation. The Office has already conceded that Parad does not expressly teach a “software scheduling agent.” Accordingly, Parad fails to anticipate any of the claims. *In re Oelrich*, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d (BNA) 1461, 1463-1464 (Pat. & Tm. Off. Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987).

B. THE PRIMA FACIE CASE IS DEFICIENT

"It is by now well settled that the burden of establishing a *prima facie* case of anticipation resides with the Patent and Trademark Office. *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984), quoting *In re Warner*, 379 F.2d 1011, 1016, 154 U.S.P.Q. 173, 177 (C.C.P.A. 1967); *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1788-89 (Bd. Pat. App. & Int. 1987). "[I]t is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference." *Ex parte Levy*, 17 U.S.P.Q.2d (BNA) 1461, 1462 (Pat. & Tm. Off. Bd. Pat. App. & Int. 1990). Where anticipation is found

through inherency, the Office's burden of establishing *prima facie* anticipation includes the burden of providing "...some evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art." *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987).

Applicants respectfully submit that Paper No. 13 fails to *prima facie* establish anticipation by Parad. This is most apparent with respect to the Office's reliance on the supposedly inherent teachings of Parad. As was established above, each of the independent claims recites a "software scheduling agent," which the Office concedes Parad does not teach but alleges that Parad inherently discloses. The entire treatment of this issue in Paper No. 10 is:

Parad does not positively disclose of [*sic*] having software-scheduling agent, but the claimed element is [*an*] inherent property of Parad invention.

Noticeably lacking is any semblance of any evidence or scientific reasoning as to why the disclosure of Parad inherently discloses this limitation. Since such is required by law to make the *prima facie* case, the *prima facie* case is deficient. *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987).

C. THE OFFICE'S RESPONSE TO APPLICANTS' POSITION

In response to the arguments supporting Applicants' position, the Office offered the unsupported statement that:

...Applicant's definition of the term "*software scheduling agent*" is very broad and can be interpreted as any body involving in scheduling can be considered as an *software scheduling agent*, because method, medium, system, apparatus and manufacturing are claimed and NOT software programming and therefore Parad (figure 1, elements 105 – 108) meets all the claimed invention."

Paper No. 13, Detailed Action, p. 3, ¶ 2. As earlier noted, the Office has the duty to make the *prima facie* case with particularity, *Ex parte Levy*, 17 U.S.P.Q.2d (BNA) 1461, 1462 (Pat. & Tm. Off. Bd. Pat. App. & Int. 1990) (identify each element of the claimed invention in the prior art); *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1788-89 (Bd. Pat. App. & Int. 1987) (provide reasoning supporting inherency allegation), which this statement fatally lacks.

There is no support in Applicants' specification for the proposition that a scheduling agent represent more than one manufacturing domain entity at any given time or that a scheduling agent be implemented in anything other than software. Thus, there is no support for a definition of the term "software scheduling agent" in which an entity represents, for instance, a whole subsystem comprising large numbers of manufacturing domain entities. Nor is there any support for the prospect that a scheduling agent be implemented in, for instance, hardware. Note that the claims in issue actually recite a *software* scheduling agent, as is conceded by placing the term "software scheduling agent" in quotations. The passage quoted above is therefore erroneous on its face. However much the Office might wish to the contrary, the statement that *any* software entity that schedules constitutes a software scheduling agent is clearly wrong.

Furthermore, although not clear from the quoted passage, it appears to Applicants that the Office may be taking the position that the software aspect of the scheduling agent is immaterial because "software programming" is not claimed. The Office apparently makes this argument to obviate Applicant's inherency argument with respect to Parad. Each of the claims expressly recites a "software scheduling agent", and each of those limitations must be disclosed in the prior art as required by *In re Bond*, 15 U.S.P.Q.2d (BNA) 1566, 1567 (Fed. Cir. 1990) (anticipating reference must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim).

Applicants also note that, for the first time, the Office attempted in Paper No. 13 to identify something it associates with “software scheduling agents” in Parad. Paper No. 13, Detailed Action, p. 3, ¶ 2. The Office identifies elements 105 – 108 in Figure 1. Applicants note that Figure 1 is a flowchart of a method (Parad, col. 5, l. 66-67), and elements 105 – 108, which are functionalities of some aspect of Parad’s system (col. 9, l. 19-33). However, as Applicants earlier noted:

Parad expressly states at col. 7, lines 53-54 that “[t]he present invention may be implemented in any combination of software, firmware, or hardware....” Thus, even if the Office can identify some functionality, or collection of functionalities, corresponding to that of Applicants’ claimed “software scheduling agent,” such functionality need not necessarily be implemented in software. Parad’s own disclosure establishes that such functionality could be implemented in, for example, hardware, as opposed to software.

Response to Office Action Dated January 16, 2004, p. 4. Thus, the disclosure of the elements 105 – 108 to which the Office finally points fails to inherently disclose a “software scheduling agent.” *In re Oelrich*, 212 U.S.P.Q. (BNA) 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d (BNA) 1461, 1463-1464 (Pat. & Tm. Off. Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d (BNA) 1788, 1789 (Bd. Pat. App. & Int. 1987).

IX. CLAIMS IN ISSUE

The claims in issue are set forth in the APPENDIX hereto.

X. CONCLUSION

Applicants therefore respectfully submit that all claims 1-53 are in condition for allowance. Each of the independent claims recites a “software scheduling agent”, which the Office has admitted Parad does not expressly teach. The Office alleges that Parad teaches this

limitation inherently, but Parad fails on its face to meet the legal tests for inherent disclosure. Even if it did not, the Office has failed to adequately support its position that it does. Accordingly, Applicants request that the rejections be overturned.


Please date stamp and return the enclosed postcard to evidence receipt of this document.

Respectfully submitted,

Date: November 22, 2004

WILLIAMS, MORGAN & AMERSON
CUSTOMER NUMBER: 23720

10333 Richmond Dr., Suite 1100
Houston, Texas 77042
(713) 934-4053 ph


Jeffrey A. Pyle
Reg. No. 34,904
Attorney for Applicants

APPENDIX
(Claims in Issue)

1 1. (Original) A method for scheduling in an automated manufacturing environment,
2 comprising:

3 detecting an occurrence of a predetermined event in a process flow;
4 notifying a software scheduling agent of the occurrence; and
5 reactively scheduling an action from the software scheduling agent responsive to the
6 detection of the predetermined event.

1 2. (Original) The method of claim 1, wherein detecting the occurrence of the
2 predetermined event includes detecting an unplanned event or an unexpected event.

1 3. (Original) The method of claim 1, wherein detecting the occurrence of the
2 predetermined event includes detecting an occurrence of one of an appointment state change, a
3 factory state change, and an alarm event.

1 4. (Original) The method of claim 3, wherein detecting the appointment state change
2 includes detecting at least one of an appointment cancellation, an appointment expansion, an
3 appointment shrinking, an appointment abort, an appointment changing status, an appointment
4 shift, an appointment override, an transport time update, a load time update, an unload time
5 update, a lot joining a batch, a lot leaving a batch, canceling a lot from a batch, and a
6 commitment window update.

1 5. (Original) The method of claim 3, wherein detecting the factory state change
2 includes detecting at least one of detection of a downtime occurrence; a machine becoming
3 available; a PM/Qual being detected; a chamber going down; a chamber becoming available, a
4 change in machine capabilities; a change in machine types; an addition of a process; an addition
5 of a process operation; a lot arriving at a machine; a lot process changed, a lot placed on hold, a
6 lot released from hold, a lot priority changed, a lot due date changed, a lot wafer count changed,
7 a lot process operation changed, and a lot departing a machine.

1 6. (Original) The method of claim 3, wherein detecting the alarm event includes
2 detecting at least one of an alarm firing for an appointment start time and an alarm firing for an
3 appointment end time.

1 7. (Original) The method of claim 1, wherein detecting the predetermined event
2 includes detecting at least one of an appointment cancellation, an appointment expansion, an
3 appointment shrinking, an appointment abort, an appointment becoming active, an appointment
4 nearing completion, an appointment completing, an appointment shift, an appointment override,
5 and a commitment window update, detection of a downtime occurrence; a machine becoming
6 available; a PM/Qual being detected; a chamber going down; a chamber becoming available, a
7 change in machine capabilities; a change in machine types; an addition of a process; an addition
8 of a process operation; a lot arriving at a machine; a lot process changed, a lot placed on hold, a
9 lot released from hold, a lot priority changed, a lot due date changed, a lot wafer count changed,
10 a lot process operation changed, a lot departing a machine, an alarm firing for an appointment
11 start time and an alarm firing for an appointment end time.

1 8. (Original) The method of claim 1, wherein notifying the software scheduling
2 agent of the occurrence includes:

3 sending an indication of the occurrence to a publisher;
4 publishing the occurrence from the publisher to a subscribing listener; and
5 calling the software scheduling agent from the subscribing listener.

1 9. (Original) The method of claim 1, wherein reactively scheduling the action
2 includes at least one of aborting a scheduled appointment in progress; canceling a scheduled
3 appointment before it begins; scheduling a new appointment; starting a scheduled appointment;
4 expanding the duration of a scheduled appointment; shrinking the duration of a scheduled
5 appointment; shifting a scheduled appointment; adding new processing capabilities; deleting old
6 processing capabilities; setting an alarm; canceling an alarm; and changing the status of an
7 appointment.

1 10. (Original) The method of claim 1, further comprising proactively scheduling an
2 appointment with which the predetermined event is associated.

1 11. (Original) The method of claim 10, wherein proactively scheduling the
2 appointment includes proactively scheduling the appointment from the software scheduling
3 agent.

1 12. (Original) A computer-readable, program storage medium encoded with
2 instructions that, when executed by a computer, perform a method for scheduling in an
3 automated manufacturing environment, the method comprising:

4 detecting an occurrence of a predetermined event in a process flow;

5 notifying a software scheduling agent of the occurrence; and

6 reactively scheduling an action from the software scheduling agent responsive to the
7 detection of the predetermined event.

1 13. (Original) The program storage medium of claim 12, wherein detecting the
2 occurrence of the predetermined event in the encoded method includes detecting an unplanned
3 event or an unexpected event.

1 14. (Original) The program storage medium of claim 12, wherein detecting the
2 occurrence of the predetermined event in the encoded method includes detecting an occurrence
3 of one of an appointment state change, a factory state change, and an alarm event.

1 15. (Original) The program storage medium of claim 12, wherein detecting the
2 predetermined event in the encoded method includes detecting at least one of an appointment
3 cancellation, an appointment expansion, an appointment shrinking, an appointment abort, an
4 appointment changing status, an appointment shift, an appointment override, an transport time
5 update, a load time update, an unload time update, a lot joining a batch, a lot leaving a batch,
6 canceling a lot from a batch, a commitment window update, detection of a downtime occurrence;
7 a machine becoming available; a PM/Qual being detected; a chamber going down; a chamber
8 becoming available, a change in machine capabilities; a change in machine types; an addition of
9 a process; an addition of a process operation; a lot arriving at a machine; a lot process changed, a
10 lot placed on hold, a lot released from hold, a lot priority changed, a lot due date changed, a lot
11 wafer count changed, a lot process operation changed, a lot departing a machine, an alarm firing
12 for an appointment start time and an alarm firing for an appointment end time.

1 16. (Original) The program storage medium of claim 12, wherein notifying the
2 software scheduling agent of the occurrence in the encoded method includes:

3 sending an indication of the occurrence to a publisher;
4 publishing the occurrence from the publisher to a subscribing listener; and
5 calling the software scheduling agent from the subscribing listener.

1 17. (Original) The program storage medium of claim 12, wherein reactively
2 scheduling the action in the encoded method includes at least one of aborting a scheduled
3 appointment in progress; canceling a scheduled appointment before it begins; scheduling a new
4 appointment; starting a scheduled appointment; expanding the duration of a scheduled
5 appointment; shrinking the duration of a scheduled appointment; shifting a scheduled
6 appointment; adding new processing capabilities; deleting old processing capabilities; setting an
7 alarm; canceling an alarm; and changing the status of an appointment.

1 18. (Original) The program storage medium of claim 12, wherein the encoded method
2 further comprises proactively scheduling an appointment with which the predetermined event is
3 associated.

1 19. (Original) A computing system programmed to perform a method for scheduling
2 in an automated manufacturing environment, the method comprising:

3 detecting an occurrence of a predetermined event in a process flow;
4 notifying a software scheduling agent of the occurrence; and
5 reactively scheduling an action from the software scheduling agent responsive to the
6 detection of the predetermined event.

1 20. (Original) The computing system of claim 19, wherein detecting the occurrence of
2 the predetermined event in the programmed method includes detecting an unplanned event or an
3 unexpected event.

1 21. (Original) The computing system of claim 19, wherein detecting the occurrence of
2 the predetermined event in the programmed method includes detecting an occurrence of one of
3 an appointment state change, a factory state change, and an alarm event.

1 22. (Original) The computing system of claim 19, wherein detecting the
2 predetermined event in the programmed method includes detecting at least one of an
3 appointment cancellation, an appointment expansion, an appointment shrinking, an appointment
4 abort, an appointment changing status, an appointment shift, an appointment override, an
5 transport time update, a load time update, an unload time update, a lot joining a batch, a lot
6 leaving a batch, canceling a lot from a batch, a commitment window update, detection of a
7 downtime occurrence; a machine becoming available; a PM/Qual being detected; a chamber
8 going down; a chamber becoming available, a change in machine capabilities; a change in
9 machine types; an addition of a process; an addition of a process operation; a lot arriving at a
10 machine; a lot process changed, a lot placed on hold, a lot released from hold, a lot priority
11 changed, a lot due date changed, a lot wafer count changed, a lot process operation changed, a lot
12 departing a machine, an alarm firing for an appointment start time and an alarm firing for an
13 appointment end time.

1 23. (Original) The computing system of claim 19, wherein notifying the software
2 scheduling agent of the occurrence in the programmed method includes:
3 sending an indication of the occurrence to a publisher;
4 publishing the occurrence from the publisher to a subscribing listener; and
5 calling the software scheduling agent from the subscribing listener.

1 24. (Original) The computing system of claim 19, wherein reactively scheduling the
2 action in the programmed method includes at least one of aborting a scheduled appointment in
3 progress; canceling a scheduled appointment before it begins; scheduling a new appointment;
4 starting a scheduled appointment; expanding the duration of a scheduled appointment; shrinking
5 the duration of a scheduled appointment; shifting a scheduled appointment; adding new
6 processing capabilities; deleting old processing capabilities; setting an alarm; canceling an alarm;
7 and changing the status of an appointment.

1 25. (Original) The computing system of claim 19, wherein the encoded method
2 further comprises proactively scheduling an appointment with which the predetermined event is
3 associated.

1 26. (Original) An apparatus for scheduling in an automated manufacturing
2 environment, the apparatus comprising:

3 means for detecting an occurrence of a predetermined event in a process flow;

4 means for notifying a software scheduling agent of the occurrence; and

5 means for reactively scheduling an action from the software scheduling agent responsive
6 to the detection of the predetermined event.

1 27. (Original) The method of claim 26, wherein the means for detecting the
2 occurrence of the predetermined event includes means for detecting an unplanned event or an
3 unexpected event.

1 28. (Original) The method of claim 26, wherein the means for detecting the
2 occurrence of the predetermined event includes means for detecting an occurrence of one of an
3 appointment state change, a factory state change, and an alarm event.

1 29. (Original) The method of claim 26, wherein the means for detecting the
2 predetermined event includes means for detecting at least one of an appointment cancellation, an
3 appointment expansion, an appointment shrinking, an appointment abort, an appointment
4 changing status, an appointment shift, an appointment override, an transport time update, a load
5 time update, an unload time update, a lot joining a batch, a lot leaving a batch, canceling a lot
6 from a batch, a commitment window update, detection of a downtime occurrence; a machine
7 becoming available; a PM/Qual being detected; a chamber going down; a chamber becoming
8 available, a change in machine capabilities; a change in machine types; an addition of a process;
9 an addition of a process operation; a lot arriving at a machine; a lot process changed, a lot placed
10 on hold, a lot released from hold, a lot priority changed, a lot due date changed, a lot wafer count
11 changed, a lot process operation changed, a lot departing a machine, an alarm firing for an
12 appointment start time and an alarm firing for an appointment end time.

1 30. (Original) The method of claim 26, wherein the means for notifying the software
2 scheduling agent of the occurrence includes:

3 means for sending an indication of the occurrence to a publisher;

4 means for publishing the occurrence from the publisher to a subscribing listener; and

5 means for calling the software scheduling agent from the subscribing listener.

1 31. (Original) The method of claim 26, wherein the means for reactively scheduling
2 the action includes means for at least one of aborting a scheduled appointment in progress;
3 canceling a scheduled appointment before it begins; scheduling a new appointment; starting a
4 scheduled appointment; expanding the duration of a scheduled appointment; shrinking the
5 duration of a scheduled appointment; shifting a scheduled appointment; adding new processing
6 capabilities; deleting old processing capabilities; setting an alarm; canceling an alarm; and
7 changing the status of an appointment.

1 32. (Original) The method of claim 26, further comprising means for proactively
2 scheduling an appointment with which the predetermined event is associated.

1 33. (Original) An automated manufacturing environment, comprising:
2 a process flow; and
3 a computing system, including a plurality of software scheduling agents residing thereon,
4 the software scheduling agents being capable of reactively scheduling
5 appointments for activities in the process flow responsive to a plurality of
6 predetermined events.

1 34. (Original) The automated manufacturing environment of claim 33, further
2 comprising a plurality of publishers and subscribers capable of detecting an occurrence of one of
3 the predetermined events in the process flow and notifying one of the software scheduling agent
4 of the occurrence.

1 35. (Original) The automated manufacturing environment of claim 34, wherein
2 detecting the occurrence of the predetermined event includes detecting an unplanned event or an
3 unexpected event.

1 36. (Original) The automated manufacturing environment of claim 34, wherein
2 detecting the occurrence of the predetermined event includes detecting an occurrence of one of
3 an appointment state change, a factory state change, and an alarm event.

1 37. (Original) The automated manufacturing environment of claim 34, wherein
2 detecting the predetermined event includes detecting at least one of an appointment cancellation,
3 an appointment expansion, an appointment shrinking, an appointment abort, an appointment
4 changing status, an appointment shift, an appointment override, an transport time update, a load
5 time update, an unload time update, a lot joining a batch, a lot leaving a batch, canceling a lot
6 from a batch, a commitment window update, detection of a downtime occurrence; a machine
7 becoming available; a PM/Qual being detected; a chamber going down; a chamber becoming
8 available, a change in machine capabilities; a change in machine types; an addition of a process;
9 an addition of a process operation; a lot arriving at a machine; a lot process changed, a lot placed
10 on hold, a lot released from hold, a lot priority changed, a lot due date changed, a lot wafer count
11 changed, a lot process operation changed, and a lot departing a machine, an alarm firing for an
12 appointment start time and an alarm firing for an appointment end time.

1 38. (Original) The automated manufacturing environment of claim 34, wherein
2 notifying the software scheduling agent of the occurrence includes:

3 sending an indication of the occurrence to a publisher;
4 publishing the occurrence from the publisher to a subscribing listener; and
5 calling the software scheduling agent from the subscribing listener.

1 39. (Original) The automated manufacturing environment of claim 34, wherein
2 reactively scheduling the action includes at least one of aborting a scheduled appointment in
3 progress; canceling a scheduled appointment before it begins; scheduling a new appointment;
4 starting a scheduled appointment; expanding the duration of a scheduled appointment; shrinking
5 the duration of a scheduled appointment; shifting a scheduled appointment; adding new
6 processing capabilities; deleting old processing capabilities; setting an alarm; canceling an alarm;
7 and changing the status of an appointment.

1 40. (Original) The automated manufacturing environment of claim 34, further
2 comprising proactively scheduling an appointment with which the predetermined event is
3 associated.

1 41. (Original) The automated manufacturing environment of claim 33, further
2 comprising at least one of a manufacturing execution system and an automated materials
3 handling system.

1 42. (Original) The automated manufacturing environment of claim 33, wherein the
2 computing system is at least one of a local area network, a wide area network, a system area
3 network, an intranet, or a portion of the Internet.

1 43. (Original) The automated manufacturing environment of claim 33, wherein the
2 process flow comprises a portion of a semiconductor manufacturing facility.

1 44. (Original) An automated manufacturing environment, comprising:
2 a plurality of work pieces;
3 a plurality of processing stations through which the work pieces may be processed;
4 a plurality of software scheduling agents capable of scheduling appointments for
5 processing the work pieces through the process stations, the software scheduling
6 agents capable of reactively scheduling responsive to predetermined events.

1 45. (Original) The automated manufacturing environment of claim 44, further
2 comprising a plurality of publishers and subscribers capable of detecting an occurrence of one of
3 the predetermined events in the process flow and notifying one of the software scheduling agent
4 of the occurrence.

1 46. (Original) The automated manufacturing environment of claim 45, wherein
2 detecting the occurrence of the predetermined event includes detecting an unplanned event or an
3 unexpected event.

1 47. (Original) The automated manufacturing environment of claim 45, wherein
2 detecting the occurrence of the predetermined event includes detecting an occurrence of one of
3 an appointment state change, a factory state change, and an alarm event.

1 48. (Original) The automated manufacturing environment of claim 45, wherein
2 detecting the predetermined event includes detecting at least one of an appointment cancellation,
3 an appointment expansion, an appointment shrinking, an appointment abort, an appointment

4 changing status, an appointment shift, an appointment override, an transport time update, a load
5 time update, an unload time update, a lot joining a batch, a lot leaving a batch, canceling a lot
6 from a batch, a commitment window update, detection of a downtime occurrence; a machine
7 becoming available; a PM/Qual being detected; a chamber going down; a chamber becoming
8 available, a change in machine capabilities; a change in machine types; an addition of a process;
9 an addition of a process operation; a lot arriving at a machine; a lot process changed, a lot placed
10 on hold, a lot released from hold, a lot priority changed, a lot due date changed, a lot wafer count
11 changed, a lot process operation changed, a lot departing a machine, an alarm firing for an
12 appointment start time and an alarm firing for an appointment end time.

1 49. (Original) The automated manufacturing environment of claim 45, wherein
2 notifying the software scheduling agent of the occurrence includes:

3 sending an indication of the occurrence to a publisher;
4 publishing the occurrence from the publisher to a subscribing listener; and
5 calling the software scheduling agent from the subscribing listener.

1 50. (Original) The automated manufacturing environment of claim 45, wherein
2 reactively scheduling the action includes at least one of aborting a scheduled appointment in
3 progress; canceling a scheduled appointment before it begins; scheduling a new appointment;
4 starting a scheduled appointment; expanding the duration of a scheduled appointment; shrinking
5 the duration of a scheduled appointment; shifting a scheduled appointment; adding new
6 processing capabilities; deleting old processing capabilities; setting an alarm; canceling an alarm;
7 and changing the status of an appointment.

1 51. (Original) The automated manufacturing environment of claim 45, further
2 comprising proactively scheduling an appointment with which the predetermined event is
3 associated.

1 52. (Original) The automated manufacturing environment of claim 44, further
2 comprising at least one of a manufacturing execution system and an automated materials
3 handling system.

1 53. (Original) The automated manufacturing environment of claim 44, wherein the
2 computing system is at least one of a local area network, a wide area network, a system area
3 network, an intranet, or a portion of the Internet.